No. 775,983. PATENTED NOV. 29, 1904.

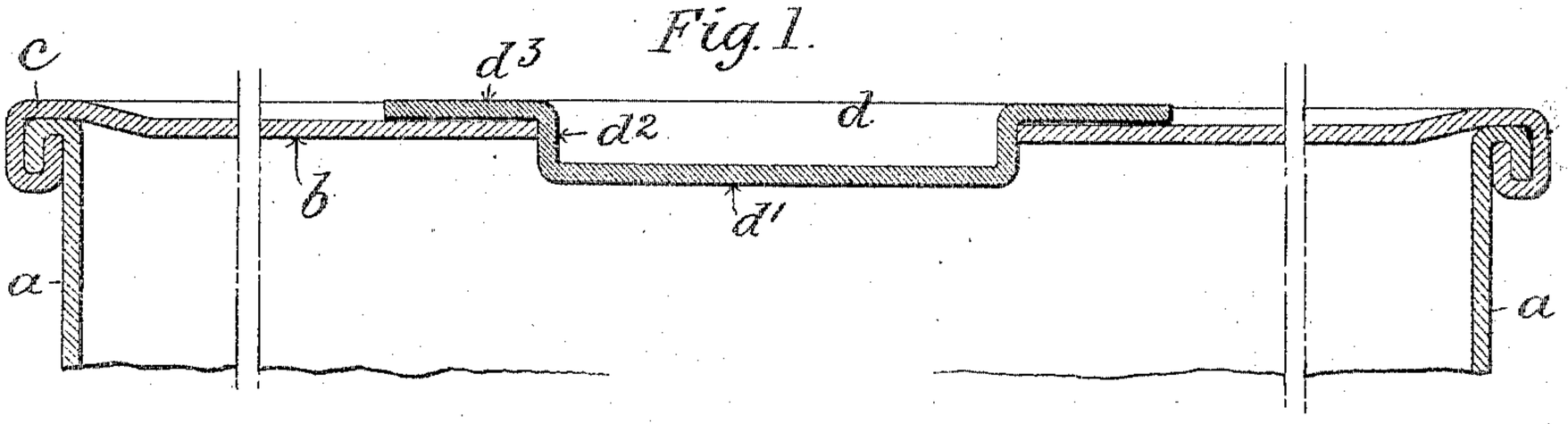
M. MAURAN.

SEAL FOR SHEET METAL VESSELS.

APPLICATION FILED JUNE 7, 1904.

NO MODEL.

Fig. 1.



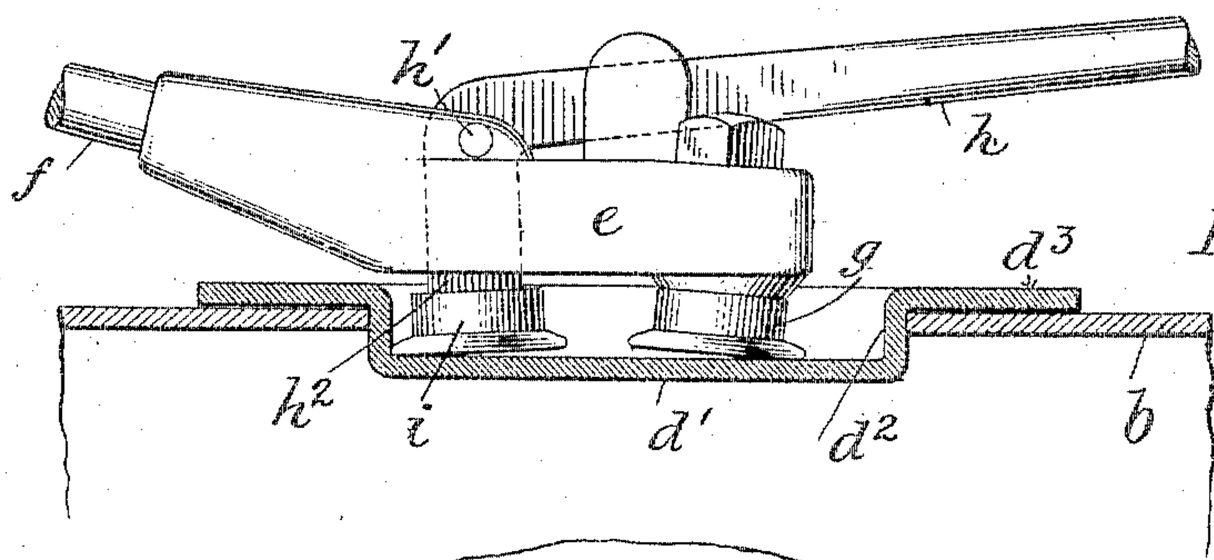


Fig. 2.

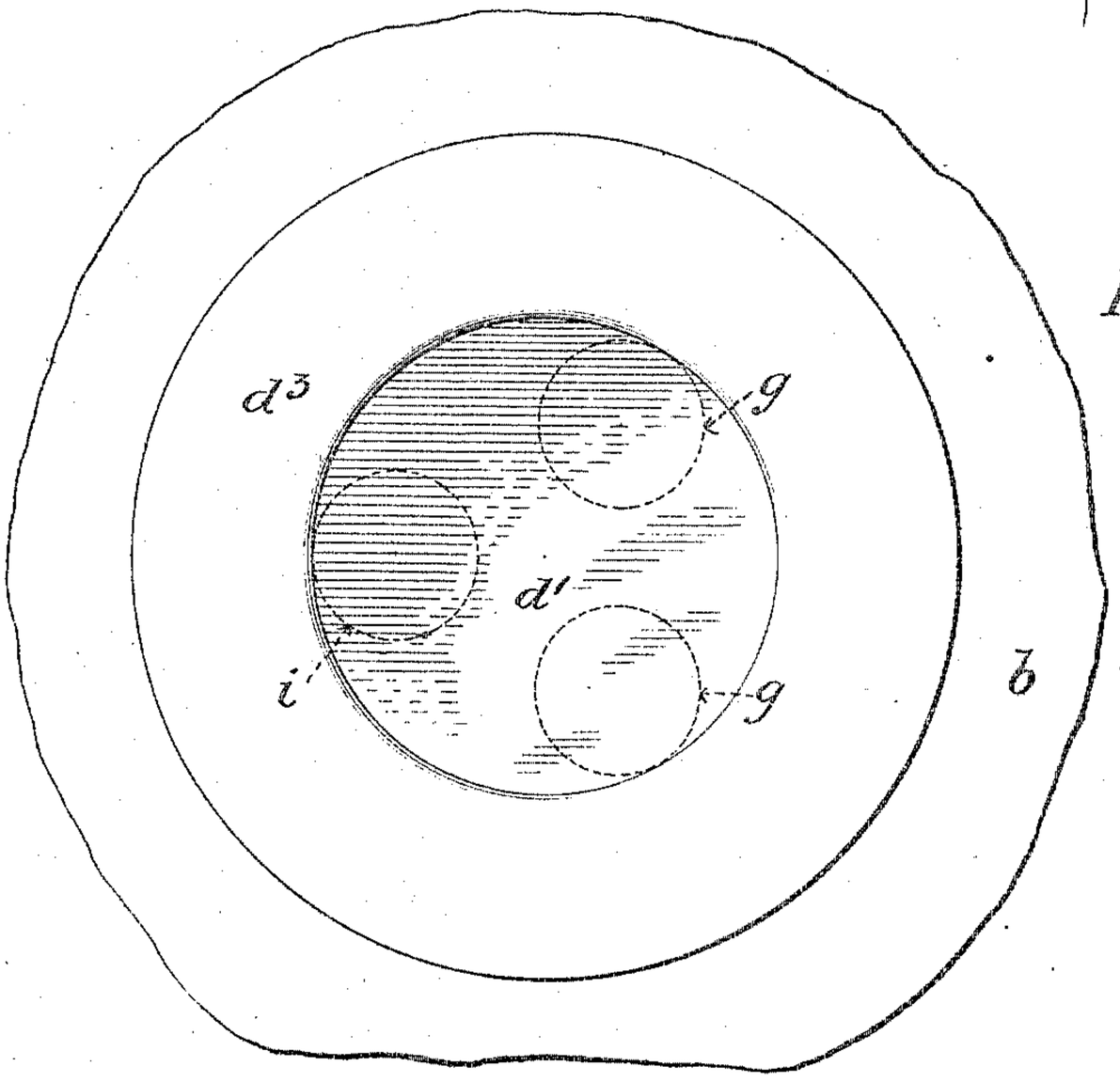


Fig. 3.

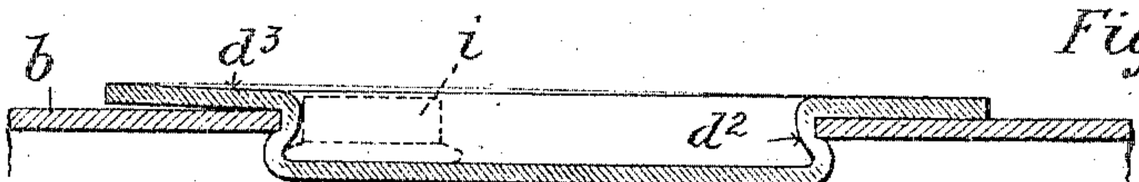


Fig. 4.

Witnesses
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No. 775,983. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

MAX MAURAN, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO CASTNER ELECTROLYTIC ALKALI COMPANY, A CORPORATION OF VIRGINIA.

SEAL FOR SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 775,983, dated November 29, 1904.

Application filed June 7, 1904. Serial No. 211,481. (No model.)

To all whom it may concern:

Be it known that I, MAX MAURAN, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Seals for Sheet-Metal Vessels, of which the following is a full, clear, and exact description.

This invention relates to the hermetical sealing of sheet-metal vessels—such as cans, barrels, and drums—and has special reference to that type of seal in which a dished cover or cap is applied to an opening in the wall of the vessel and secured in place by a beaded or similarly-jointed seam.

The object of the invention is to provide a seal which primarily shall be hermetical, and, secondarily, which can be applied and effected quickly and by means of a simple tool.

With these objects in view the invention consists of the seal hereinafter described in detail with reference to the accompanying drawings and afterward pointed out in the claim.

The drawings illustrate, in Figure 1, the upper portion of a drum or can in diametrical vertical section with the cap in position before sealing. Fig. 2 is a similar illustration with the sealing-tool in operative position. Fig. 3 is a plan of that portion of the head of the drum containing the seal, showing a portion of the sealing-tool in dotted lines; and Fig. 4 is a section of the head of the drum containing the applied and finished seal.

The improved seal is ordinarily applied by me to the disk-like head of a cylindrical sheet-metal barrel or drum adapted for the transportation of caustic soda and other chemical products which require absolutely hermetical sealing to prevent waste or deterioration of the contents. Such drums are approximately twenty-two inches in diameter, and the filling-orifice in the head which is to be sealed is about five inches in diameter and located at the center. My invention, however, is obviously not limited to this particular style of drum or can nor to any particular dimensions thereof. It is, though, a feature of my invention that the opening to be sealed is of comparatively small size with respect to the head or wall in which it is formed. By this is meant that while the invention pertains to the making of a joint or seam it does not refer to such a joint as occurs at the corners of a can where the head joins the side walls, as at that location the peculiar joint formed by my invention cannot be made. Furthermore, the joint formed by my invention must he made in a flat portion of the wall of the vessel—such, for instance, as would be afforded by the head of the barrel or a portion of the side walls already flat or made flat for the purposes of the seal.

Referring to the drawings by letter, *a* represents the cylindrical side walls of a sheet-metal barrel; *b*, the disk-like head of the barrel, and *c* any approved style of joint between the sides and head. The head is provided, preferably at the center, with a circular filling-opening, the edge of the head around the opening being flat and in substantially the same plane as the remainder of the head, except possibly for such indentations or embossings as may be impressed therein for lettering or ornamentation. This continuous flat construction is to enable the head to withstand the radial thrust that takes place in the sealing operation without bending or buckling.

The opening in the head is closed by a sheet-metal cap *d* of a dished or concavo-convex shape, having a substantially flat disk-like bottom d', short slightly-flared or vertical sides d^2, and a comparatively deep radial flange d^3. The exterior diameter of the side walls is such that they make a close friction fit with the edge of the opening, so that the cap has ordinarily to be pressed or driven into its seat by such force as can be applied against the flange with the thumbs or a light hammer. When properly seated, as in Fig. 1, the bottom of the cap is in a plane slightly below that of the head of the drum, and the lower portions of the vertical sides d^2 are in a plane between the bottom d' and the head *b*, while the flange d^3 is in contact with or close to the outer surface of the head. The cap is now to be hermetically sealed, and I accomplish

this by the aid of a suitable tool. I prefer to use the tool described in my application, Serial No. 201,689, filed April 5, 1904, which consists, essentially, of a head *e*, having a radial handle *f* and carrying on its under face two flanged beading-rollers *g*. A second radial handle *h*, diametrically opposite the first, is pivoted to the head at *h'* and has an angular extension h^2 leading through an orifice in the head and carrying a third beading-roller *i* so located with relation to the other two rollers as to locate the angles of a triangle, as shown in Fig. 3. By swinging the handles *h* and *f* on the pivot the rollers *g* and *i* will approach or separate, and so vary the size of a circle that would inclose them and be tangent to each. A tool of this character is applied to the cap, so that the flanges of the rollers will impinge against the inner corners of the cap. Then by pressing down on the handles *f* and *h* and at the same time twisting or swinging them around and back several times that portion of the vertical walls d^2 below the plane of the head *b* will be expanded or stretched radially outward and will draw that portion within the plane of head *b* with it, forcing it against the sharp edge of the opening in the head and causing the latter to sink or bite into the material of the cap. In this expanding operation the bottom *d'* is also necessarily expanded to follow the sides d^2 outward, and when thus set the bottom serves as a brace to prevent the expanded sides from springing back to the original shape and reducing the seal. To obtain an effective seal at all points around the circle, it is important that the flange d^3 should be free while the expansion is taking place, for it can be seen that if the flange were held rigid the sides would not be free to respond to the action of the rollers, and it would also tend to make the sides spring loose after the beading or upsetting operation. As the best evidence of this it is pointed out that after the sealing operation the flange of the cap is in a warped condition, being lifted from the surface of the head *a* in some places, while hugging it in others, as seen in Fig. 4.

I ascribe the efficiency of the seal very largely to the fact that the sides d^2 are not hindered in their expansion by a rigidly-held flange and that after they are expanded they are held set by the expanded bottom. Inasmuch as the expanding force is radially applied substantially in the plane of the head *b* it follows that the edge of the head around the sealed opening should be in the same plane that it may not yield to the strain. It is evident that if the edge were inclined upward or downward or an annular gutter were formed in the head at or near the edge the metal would be likely to fold up under the radial pressure exerted upon it by the tool and defeat the object of the invention. It will also be clear now that the seal cannot be made at the corners of the barrel, for the reason that the resistance to the radial pressure would not occur in that location to a serviceable extent. With a large flat head and a small opening at the center the best results are obtained.

I wish to differentiate the present invention from those in which the metal of the cap or the head is folded to embrace or clamp the edge of the opposed member and those in which the joint is made by a riveting process. In all such instances the efficiency of the seal is not so great as in mine, where the metal of one part is forced into that of the other and there held.

Having described my invention, I claim—

A metal-can closure comprising a flat wall of the can having a circular opening therein of comparatively small dimensions, the edge of which is flat and in the same general plane as the remainder of the wall, in combination with a sheet-metal cap located in said opening and having a disk-like bottom, side walls and an exterior radial flange, a portion of the side walls lying in the plane of the flat can-wall being penetrated radially by the edge of the opening, while another portion of the side walls beneath the plane of the can-wall, together with the disk-like bottom, extends radially to a greater diameter than the opening in the can-wall and thereby maintains the side walls of the cap in their penetrated condition, substantially as described.

In witness whereof I subscribe my signature in the presence of two witnesses.

MAX MAURAN.

Witnesses:
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